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RD

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/654,093	08/31/00	THAKUR	R 94-0302.02

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MM92/0126

EXAMINER	
BROCK II, P	
ART UNIT	PAPER NUMBER

2815

DATE MAILED: 01/26/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/654,093	Applicant(s) THAKUR ET AL.	
	Examiner Paul E Brock II	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 52-64 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 52-64 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>3</u> . | 20) <input type="checkbox"/> Other: |

DETAILED ACTION

Election/Restrictions

1. Claims 1- 51 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Election was made **without** traverse in Paper No. 2.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 52 – 57 are rejected under 35 U.S.C. 102(b) as being anticipated by Doan et al.

Doan et al. discloses a method of processing a semiconductor device in figure 2.

With regard to claim 52, Ahlburn discloses in figure 2 depositing a dielectric layer (17) over a semiconductor substrate. It is inherent in Doan et al. that electrically chargeable particles are allowed to occur in the dielectric layer, because the dielectric layer is TEOS as stated in column 4, line 43. It is inherent in the dielectric layer that some diffusion of the electrically chargeable particles are allowed, because the dielectric layer is TEOS. It is inherent in Doan et al. that the silicon nitride layer (40) prevents at least some of the electrically chargeable particles from reaching the substrate.

With regard to claim 53, it is inherent feature in the method of Doan et al. that the step of depositing a dielectric layer of TEOS comprises depositing a dielectric layer using an organic precursor. It is inherent feature at the molecular level in the method of Doan et al. that allowing

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electrically chargeable particles to occur in the dielectric layer comprises allowing an organic component of the organic precursor to deposit in the dielectric layer. Doan et al. discloses in column 4, line 6 the preventing step comprises layering a barrier (40) over the substrate using a non-organic precursor (plasma processing) prior to the step of depositing a dielectric layer.

With regard to claim 54, it is inherent that the plasma processing layering step comprises layering a barrier using silane.

With regard to claim 55, Doan et al. discloses a method of at least partially forming a circuit device in figures 4 – 6. Daon et al. discloses providing a semiconductor substrate in figure 4. Doan et al. discloses layering a carbon-free barrier on the substrate. Doan et al. discloses layering a carbon-containing dielectric layer on the barrier.

With regard to claim 56, Doan et al. discloses in column 4, line 6 the step of layering a carbon-free barrier on the substrate further comprises layering the carbon-free barrier using a plasma.

With regard to claim 57, Doan et al. discloses further comprising a step of heating the carbon-containing dielectric in column 4, lines 44 and 45.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan et al. as applied to claims 55 and 57 above, and further in view of Ying.

With regard to claim 58, Doan et al. does not directly disclose the step of heating the carbon-containing dielectric comprises raising a temperature to a range of 850C – 1050C for at least 5 seconds. Ying teaches in column 4, lines 18 - 22 the step of heating a carbon-containing dielectric comprising raising a temperature to a range of 850C – 1050C for at least 5 seconds. While Ying teaches a few seconds and not directly at least 5 seconds it would be apparent to the skilled artisan that at least 5 seconds in the rapid thermal anneal environment of Ying would result in a sufficient anneal. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the rapid thermal anneal of Ying in the method of Doan et al. in order to reflow the carbon containing dielectric layer as stated by Ying in column 4, lines 18 – 22.

With regard to claim 59, Doan et al. does not directly disclose the step of heating the carbon-containing dielectric comprises raising a temperature to a range of a range of 750C-1000C for at least 5 minutes. Ying teaches in column 4, lines 18 – 22 the step of heating a carbon-containing dielectric comprising raising a temperature to a range of 750C-1000C for at least 5 minutes. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the steam ambient anneal of Ying in the method of Doan et al. in order to reflow the carbon containing dielectric layer as stated by Ying in column 4, lines 18 – 22.

5. Claims 60, 61, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan et al. in view of Ghezzi et al.

Doan et al. discloses a method of processing a substrate in figures 4 – 6. Doan et al. discloses in figure 5 depositing an oxide charge barrier over the substrate. Doan et al. discloses in figure 6 depositing a generally insulative material over the oxide charge barrier, wherein the generally

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insulative material is less insulative than the barrier. Doan et al. does not disclose a substrate comprising two active areas and an intervening insulating region, and providing a generally conductive element. Ghezzi et al. teaches in figure 3 a substrate (2) comprising two active areas and an intervening insulating region and providing a generally conductive element (5) over a generally insulative material (21), wherein the element is generally laterally coextensive with the intervening insulating region. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the active areas and generally conductive element of Ghezzi et al. in the process of Doan et al. in order to form a floating gate as stated by Ghezzi et al. in column 3, lines 31 – 40.

With regard to claim 61, Doan et al. discloses in column 4, line 43 the step of depositing a generally insulative material comprises depositing a generally insulative material that is allowed to comprise oxide charges.

With regard to claim 63, Doan et al. discloses in column 4, lines 44 and 45 annealing the generally insulative material. It is an inherent property of the generally insulative material, because the generally insulative material is TEOS as stated in column 4, line 43, that an oxide charge is allowed to migrate toward the substrate in response to the annealing step. It is an inherent property of the oxide charge barrier, because the oxide charge barrier is silicon nitride as stated in column 4, line 19, to intercept the oxide charge before the oxide charge reaches the surface.

With regard to claim 64, Doan et al. discloses in figure 6 refraining from depositing any generally conductive material before the step of depositing a generally insulative material.

6. Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doan et al. as applied to claim 60 above, and further in view of Van Der Scheer et al.

Doan et al. does not disclose plasma treating the substrate. Van Der Scheer et al. teaches in column 1, lines 28 – 32 plasma treating the substrate. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the plasma treated substrate of Van Der Scheer et al. in the method of Doan et al. in order for the preparation of non-porous (i.e. dense) selective top layers of composite multi-layer membranes as stated by Van Der Scheer et al. in column 1, lines 14 – 19.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Geisler et al. discloses plasma treating a substrate. Yamaguchi et al. discloses forming a conductive layer over an insulative layer. Rodder, Ahlburn, Eltoukhy et al., and Merenda et al. disclose forming a carbon containing dielectric over a non-carbon containing dielectric. Maeda et al. discloses the formation of a carbon containing dielectric.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul E Brock II whose telephone number is (703)308-6236. The examiner can normally be reached on 8:30 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703)308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Paul E Brock II
January 19, 2001



EDDIE C. LEE
PRIMARY EXAMINER